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An analysis of non-GAAP financial metrics

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Abstract

As non-GAAP financial reports have proliferated in the last three decades, market participants have begun to question the accuracy and credibility of non-GAAP information, particularly in the context of equity valuation. On the one hand, companies' managers claim that non-GAAP earnings metrics have important value implication for investors as it can reduce "accounting noises" and reveal relevant insider information that might be neglected through standardized recording systems like GAAP. On the other hand, market regulations and researchers are more critical towards non-GAAP metrics, criticizing that non-GAAP exclusions are more than relevant and excluding them will yield misleading and inaccurate information. This empirical study, therefore, firstly aims to examine the development of non-GAAP financial metrics both in term of frequency of publication and magnitude of non-GAAP exclusions. In the period from 2003 to 2015, the amount of non-GAAP earnings reports has doubled and the gap between non-GAAP and GAAP metrics has become larger, indicating managers have become more aggressive in their non-GAAP reporting. Secondly, in attempt to identify the key drivers behind the difference between GAAP and non-GAAP earnings metrics (non-GAAP exclusions), we find that special items are strongly correlated to non-GAAP exclusions, suggesting that managers are more likely to exclude special items to come to better earnings numbers. One interesting finding is that cost of goods sold and selling, and general administration expenses also have strong links to non-GAAP exclusions. One possible explanation is that as managers exhaust in choices of exclusions, they will resort to less obvious options; that would be more likely to yield flawed and inaccurate financial information.

Keywords GAAP; non-GAAP; pro forma, non-GAAP adjustments, special items, exclusions

Contents

1. Introduction

Since the 1990s, companies began providing non-GAAP financial measures, claiming that GAAP financial measures do not adequately capture companies' on-going core businesses, hence not be adequate companies' valuations. Non-GAAP financial measures are commonly produced by making adjustments to the comparable GAAP measures. Since there are no mutual and objective definitions of non-GAAP adjustments and no common agreements on adjusting methods; and non-GAAP financial measures are not subjected to auditing, companies have their own ways of reporting non-GAAP measures.

In the last three decades, we have seen a gradual increase in frequency of non-GAAP earnings reporting. At the beginning of 1990s, there was only a handful of high-tech companies that published their non-GAAP earnings metrics. In 2014, almost 71% of listed firms on S&P published its non-GAAP earnings metrics (Black, 2017). There are some possible explanations for the proliferation of non-GAAP earnings metrics. Firstly, as the market becomes more complex, the demand for more accurate information of firm performance naturally grew. In response the demand, firm managers publish their non-GAAP earnings metrics as a complement to their standardized GAAP metrics, claiming that non-GAAP earnings metrics better reflects companies' core performances. Although standardized GAAP measures are more comparable, it ignores many factors that are relevant for companies' core business. Secondly, market participants have become more and more sensitive to companies' earnings reports, especially after financial crisis in 2008. Even a small drop in earnings might affect companies' market values. This give managers strong incentives to make their financial metrics look more favorable. Many prior studies also suggest that managers opportunistically manipulate non-GAAP earnings numbers in order to achieve a better earnings perception from market participants. At the same time, as relationship between investors, analysts and corporation management have become more complicated and interrelated, even a small negative earnings surprise can have a big effect on companies' stock prices. Firm managers, therefore, try to manipulate earnings number to convey a more favorable picture of the firm to the market. Also, since the managers' compensation structures have grown to be intertwined with companies' performance, there have been evidences that managers purposefully adopt earnings management or use non-

GAAP reports to enhance performance perceptions, in order to guarantee better compensations.

Prior researches suggest that not only the frequency of non-GAAP earning disclosures has increased but also types of exclusions have become more complicated and the magnitude of the exclusions have increased drastically over time. Since there is no definition of non-GAAP earnings metrics, types of exclusion vary largely across firms. Although non-GAAP reporting is supervised by SEC. There are simply no cast-iron frameworks on controlling how managers adjust their non-GAAP earnings. The regulations on non-GAAP earnings metrics, despite having been tightened up in recently years, are still limiting. Therefore, companies are getting more creative with non-GAAP measure reporting and types of adjustments evolved constantly. In response to the increase in amount of non-GAAP reports and unregulated methods, SEC released regulation G in 2003 tightening up the regulations around non-GAAP measures. The issuance of regulation G seems not having been able to bring out long-term changes in non-GAAP reporting. For example, before regulation G (2003), non-cash, transitory and non-recurring items are considered as most common types of adjustments (Bhattacharya et al., 2003; Doyle et al, 2003; Sloan and Bradshaw, 2002). Particularly, expenses such as employee stock-based compensation, goodwill amortization, merge and acquisition cost, restructuring cost are commonly excluded. Companies' managers claimed that these transitory items are more likely to add noises to company's core performances and excluding them would render a better picture of companies' financial performances, especially in the long run. After the regulation G (2003), managers have adapted their methods of non-GAAP adjustments and are inclined to use unexpected items or special items to manipulate earnings number (Kovel, 2008; Doyle, 2013). At the same time, the gap between GAAP measures and their comparable non-GAAP measures seems to grow gradually, showing that managers are getting more and more aggressive in non-GAAP reporting.

While managers argue that by excluding these transitory and non-recurring expenses, non-GAAP metrics is cleaner and more informative and better predict firms' future profitability (Brown and Sivakumar, 2003). Many researchers suggest these exclusions are far from unimportant or irrelevant (Doyle, 2013). Non-GAAP earnings metrics are criticized to be misleading, ad-hoc and incomplete. Despite all criticism about possible opportunistic behaviors of managers in disclosing non-GAAP metrics, market participants still response

positively to non-GAAP earnings metrics disclosures (Bhattacharya et al, 2007, Doyle, 2013). While some of the market participants, particularly non-professional investors are likely to be more influenced by non-GAAP earning metrics, many skillful analysts are also not able to fully understand non-GAAP exclusions and, thereby not able to properly discount those earnings surprises. Some researchers suggest that even analysts and professional investors rely largely on non-GAAP measures in their valuations.

The intensifying public criticism towards non-GAAP reporting is the main motivation of this paper. Prior researches report that non-GAAP earnings disclosures have proliferated in the last three decades. As the method of producing and disclosing non-GAAP earnings metrics have become more complicated and opportunistic, we'd like to see whether the magnitudes as well as the type of non-GAAP exclusions have increased and varied during the period from 2003 to 2016. Also, as regulators have constantly issued warnings and additional regulations to restrict the misleading disclosures and opportunistic usage of non-GAAP earnings numbers, we would like to see whether additional regulations, particularly the implementation of Reg G have achieved its purpose of reducing opportunistic behaviors of managers. Another motivation for this paper is the availability of the first large-sample data set of managers' non-GAAP earnings metrics collected by Bentley et al. (2018). As non-GAAP earnings metrics disclosures are not compulsory, there is no systematic and sorted database of managers' non-GAAP numbers available for the public. There have been some attempts to hand-collect sample of managers' non-GAAP earnings such as researches by Bhattacharya et. al (2003), Marques (2006), Black et. al. (2017), etc. These samples are, however, very limiting, for example, small in size as well as short in time span. Alternatively, researchers frequently use analyst forecast data I/B/E/S as a proxy for managers' non-GAAP metrics. As analyst forecast data are produced based on companies' performances given by managers, analyst forecast data I/B/E/S can reflect largely managers' messages on companies' core performance. Despite being popular, the usage of analysts' I/B/E/S data are often questioned by researchers as it ignores the aggressiveness of managers' reporting choices. On the other hand, although managers can influence analysts' forecast indirectly, analysts are still capable of making independent decisions whether or not to take into account managers' information. The main reason for researchers to use I/B/E/S data as proxy for pro-forma financial metrics is due to lack of data on managers' non-GAAP numbers. Therefore, by using sample provided in Bently's

research (2018), we expect to be able to provide a better analysis on managers' non-GAAP earnings metrics.

The first purpose of this paper is to examine the trend in reporting of non-GAAP earnings metrics over the period from 2003 to 2016 in term of frequency and magnitude. We examine the total amount of non_GAAP reports as well as the mean value of Earning Per Share (EPS) from both GAAP and non_GAAP reports in order to give a overall picture on development trend of non_GAAP reporting. Firstly, we find that the publishing of non_GAAP reporting have become popular and companies have been released their non_GAAP earnings metrics more frequently since 2003 until 2016. Although market experienced a small drop in the amount of non_GAAP reports in 2003 when the regulation G was issued, the effect of regulation G quickly deteriorated. As the market are in need for more information and more sensitive to earnings numbers, more and more companies have adopted the non_GAAP reporting practices, making the amount of non_GAAP almost doubled in over 10 years. Secondly, we find that the level of non_GAAP earnings numbers has always been higher than GAAP earning numbers. Although development of the value of non_GAAP_EPS over time follows to the large extent the development pattern of GAAP_EPS values from period of 2003 to 2016, the gap between non_GAAP _EPS and non_GAAP_EPS values grew, especially after the financial crisis in 2008. After the crisis, the difference (or exclusions) doubled and remained at higher level until 2016. The level of GAAP_EPS dropped drastically but level of non_GAAP_EPS remains relatively at the same level. This partly shows that managers are more aggressive in excluding earnings components in order to create better non_GAAP financial metrics, especially during crisis period.

The second purpose of this paper is to identify the main potential drivers behind the differences (Exclusions) between the GAAP and non_GAAP metrics. By investigating correlation between the exclusions and line items in income statement, we expect to find out what expenses are likely to be related to non-GAAP exclusions. The result indicates that the among the expense items in income statement, Cost of Goods Sold is the largest cost, followed by Selling, General and Administrative expenses, and others. On the other hand, Special items is smallest expense. However, special items, have the strongest link with non-GAAP exclusions. As special items are non-recurring item, it agrees with

previous literature that managers are likely to exclude non_recurring items in their non-GAAP reporting.

With these main purposes, this paper is divided in to three following sections. We will continue with literature review section where we review previous researches on development of non-GAAP earnings reporting, earnings quality and earnings management, common non-GAAP adjustments, the issuance of regulation G and its influence on non-GAAP reporting as well as our hypothesis development. In the research design section, we will discuss the sample choice, variables selection and regression model. In empirical result section, we discuss the trend in non-GAAP development in term of both quantity and quality, also the relation between income statement's line items and non-GAAP adjustments. Finally, in conclusion, we will summary our findings, discuss limitations, application of this study, as well as suggestions for further studies.

2. Literature review and hypothesis development

2.1. Non-GAAP earnings metrics

Non-GAAP earnings numbers, commonly used in stock valuations, are customized metrics from earnings results produced according to GAAP standards. After companies' GAAP earnings numbers are produced, managers often modify these numbers by excluding some supposedly unimportant items or expenses to product non-GAAP earnings metrics which are claimed by managers to be a better indicator of companies' core business and a better predictor for future performance. These non-GAAP metrics are released along with earnings announcements and are used mostly by various market participants for company valuations. There are some different terms for non-GAAP earnings metrics, namely "pro forma earnings" "street earnings", "operating earnings", etc. Among the companies that published pro forma earnings, 49.9% are firms in the service industry (advertising service, technology-related service, and other professional services) and 30.7% are from the manufacturing industry (food, chemicals, paper, machinery, electronics and transportation, etc.) (Lougee and Marquardt, 2004). Moreover, those firms with non-GAAP earnings are generally younger (Bhattacharya and Black, 2004).

There are two different types of non-GAAP earnings metrics, one produced by companies themselves and the other by analysts. Often the analysts' non-GAAP earnings metrics, in the other words, I/B/E/S metrics are used as proxy for managers' non-GAAP earnings metrics, especially in stock valuation. As publishing non-GAAP earnings is not compulsory, there is no consistent and systematic data collection of non-GAAP earnings available to the public. There have been few attempts at hand-collecting pro-forma metrics, they are, however smaller size sample and limited to some certain report settings or certain industries (Bradshaw, 2011; Bhattacharya, 2004; Easton, 2003; etc.). Hand-collecting this data set is time-consuming and quite often the sample size and characteristics are statistically limiting and irrelevant for further researches in different contexts. Therefore, researchers have been using I/B/E/S data as proxy for managers' non-GAAP metrics, being aware of the tradeoffs. For instance, I/B/E/S earning numbers are said to not be able to accurately identify managers' motivation and aggressiveness in non-GAAP reporting. Generally speaking, analysts' non-GAAP numbers agree largely with managers' non-GAAP metrics, sometimes analysts do disregard managers' exclusions, resulting in I/B/E/S numbers being different from managers' earnings numbers (Bently et al., 2018).

Using analyst's non-GAAP metrics as proxy for managers' non-GAAP metrics has been criticized as inappropriate and insufficient (Bhattacharya, 2003). Managers' and analysts' non-GAAP metrics are not only different in nature, attributes but also the motives behind their disclosures. Often, before managers disclose company's non-GAAP metrics earnings in its earnings announcement, there are press releases informing market participants about potential exclusions (Gu and Chen, 2004). When the managers' non-GAAP metrics are released, analysts' will decide to adjust their EPS earnings or not. Hence, managers do have power to influence analysts' estimates to a certain extent (Doyle, 2013) even though analysts and managers often claim that their non-GAAP metrics are independent from each other. Therefore, managers' non-GAAP metrics can be somewhat reflected in analysts' non-GAAP metrics. On the other hand, analysts can decide to totally ignore managers' non-GAAP calculations and exclude items that they see fit in their estimations. Analysts' non-GAAP metrics, hence, also might not be accurate proxy for managers' non-GAAP metrics (Bentley, 2018). In this paper, we will directly use managers' non-GAAP metrics due to the availability of data. Non-GAAP earning metrics, in this paper, means managers' non-GAAP metrics.

There are two contradicting views on why managers disclose non-GAAP metrics. Managers want either to improve performance perception or to better communicate with investors about their performance (Heflin, 2008). When the market and firm management have become more and more independent on each other, market participants can react aggressively to even very small negative earnings surprises. This gives managers' incentives to avoid negative surprise by using non-GAAP earnings metrics (Kasznik and Lev, 1995; Matsumoto, 2000). Also, managers can manipulate earnings by leaving out certain expense items in order to meet analysts' forecasts, signaling a positive picture of performance to market participants (Bhattacharya, 2001; Lougee and Marquardt, 2004; Doyle and Soliman, 2005). Bowen et al, (2005) found evidences that managers purposefully emphasize non-GAAP earnings in its earnings announcement. Also, managers proactively try to define and influence managers' view influences (Sloan and Bradshaw, 2001). On the other hand, there have been evidences, suggesting that managers altruistically want to better communicate with market participants about firm core performance which GAAP metrics fail to convey (Bhattacharya et al., 2007; and Doyle, 2013).

2.2. Development of non-GAAP earnings reporting

The rise in the popularity of non-GAAP earning metrics seems was triggered from early 1990s starting out from service and high-tech industries. (Bhattacharya, 2003 and Sender, 2002). Anecdotally, non-GAAP earning metrics was originally firm managers' idea because they want to actively provide market participants with earnings information that better reflects companies' performance. However, there have been also claims that firm managers by producing non-GAAP metrics are just simply responding to market pressure for more accurate earnings information (Sloan and Bradshaw, 2002). Dichev and Tang (2008) found another potential explanation for the proliferation of non-GAAP reporting. When the market becomes more complex and volatile, GAAP recording system became obsolete and failed to reflect the real firm's performance, making it less useful for firm valuations (Dichev and Tang, 2008 and Dichev et al, 2013). Regardless of the origin or the original motives, reporting of non-GAAP by firm managers gradually increased and the use of non-GAAP metrics by market participants spread out to all industries. The amount

of non-GAAP metrics release was 181 in 1998 and 695 in 2000 and the numbers of adjustment have arisen by 1100 units in the period from 1998 to 2000. (Bhattacharya, 2003). Over the last 20 years, not only the frequency of non-GAAP earnings metrics but also the differences between GAAP and non-GAAP metrics have increased drastically; and certain types of exclusions have become more common. Bentley, Christensen, Gee and Whipple (2018), reported that a non-GAAP EPS metric was available for approximately 60% of all firms in 2013, while Black, Christensen, Ciesielski, and Whipple (2018) found that 71% of firms in the S&P500 disclosed non-GAAP earnings in 2014.

2.3. Common types of exclusion in non-GAAP earnings metric disclosures

Since there is no objective definition for non-GAAP earnings metrics, managers can adjust pro forma earnings figures in numerous ways. For example, non-GAAP exclusions can occur at different levels, from income statement level (Restructuring cost) to gross profit level (Store-specific profit). With regards to time, some exclusions such as estimated cost for restructuring are related to future performance estimation but they can also associate with already-occurred expenses like write-downs. Also, some exclusions are non-discretionary, and some are discretionary accruals (Goodwill amortization versus asset impairment) (Doyle, 2003). Therefore, managers' non-GAAP earnings numbers are often not comparable among firms. There are, however, a common observation found from literatures that pro forma earnings are almost always higher than GAAP earnings numbers (Bhattacharya et al, 2003; Brown and Sivakumar, 2003; Black and Christensen, 2009), resulting in the fact that pro forma numbers meet or beat analysts' forecasts more often than GAAP earnings figures (Bhattacharya at al., 2003). Also, Doyle (2003) observed in his research that all of decisions regarding exclusions were always deliberately made by managers. This raises the question on the quality of managers' non-GAAP earnings figures whether they can mislead market participants.

Although the types of adjustments which managers make to their non-GAAP earnings numbers vary across firms, non-cash and non-recurring items are the most common types of pro forma adjustments (Bhattacharya et al., 2003; Doyle et al., 2003; Sloan and Bradshaw, 2002). More specifically, employee stock-based compensation, goodwill amortization, restructuring costs, write-downs and impairment, merge and acquisition cost,

research and development expenditures are among the most common items to be excluded. (Sloan and Bradshaw, 2001). Managers often claim that by removing these irrelevant and unimportant items, non-GAAP earnings numbers reflect better companies' core performance and are better predictor of future cash flow; thereby will give out more accurate valuations. Halsey and Soybel (200) concurred that removal of non-cash and non-recurring items "enhances comparability in time-series measures" and "items such as restructuring charges and gains and losses on the sales of assets have little implication for future earnings". On the contrary, many practitioners, researchers and regulators find these items far from unimportant and excluding them will lead to incomplete and misleading earnings measures. Doyle et al, (2003) investigated the informational properties of pro forma earnings and found that higher level of exclusions in non-cash and non-recurring items will lead to predictably higher stock valuation. For example, in AT&T cases (2001), per share price increase from -39 cents on GAAP basis to 5 cents after the exclusions of restructuring and other non-recurring charges (Doyle at al., 2003).

As mentioned, there are no general definitions on non-GAAP exclusions, types of adjustments vary largely across industries as well as companies. However, researchers have observed several trends when it comes to managers' choice of adjustments. First of almost all of adjustments are made from expenses that decrease companies' income, meaning that, most non-GAAP adjustments have an income-increasing effects (Doyle, 2003; Bhattacharya et al., 2003; Bradshaw and Sloan, 2003; etc.). This often raises doubt among researchers and market participants about managers' opportunistic behaviors in non-GAAP reporting. Secondly, there are several common expenses and charges that are used in producing non-GAAP earning metrics. For example, depreciation and amortization expenses is one of the most common items used in the period from 1998 to 2002 (Bhattacharya, 2002). Restructuring charges (merger and acquisition costs), goodwill amortization, write-downs and impairments and stock-based charges are among the most common exclusions. For instance, Bradshaw and Sloan (2002) observed that companies excluded items like payroll taxes on stock options, stock rights, deferred compensations, etc. In their study, Bradshaw and Sloan (2003) measured the magnitude and frequency of these common exclusions and find that both magnitude as well as frequency increased drastically.

Special items and other exclusions

According to Doyle (2003), managers' exclusions often fall into two categories: Special items and other exclusions. "Special items: Unusual or nonrecurring items presented above taxes" (Compustat, 2019). Some common special items include write-downs, gains, and losses, restructuring costs. There are, however, some special items that are vaguer. Some examples of other exclusions are amortization of goodwill, operation losses, stock compensation expense, in-process R&D charges, legal settlement costs (Doyle, 2003)

These two common types of exclusions are different not only in characteristics but also have different predictive properties (Doyle, 2003). According to Doyle's study in 2003, exclusions in special items have little predictive value for future performance. They are, therefore, high-quality exclusions, meaning that exclusions of this items have little negative effect on the quality of non-GAAP figures. On the other hand, other exclusions are highly correlated to firms' future performance. More specifically, other exclusions have high predictability power of negative future cash flow.

"A dollar of other exclusions in a quarter predicts 6.422 fewer dollars of future cash from operations over the next three years, almost as predictive as the pro forma earnings number itself" (Doyle, 2003)

In response to all the observations of impact of non-GAAP exclusions on valuation, reg G requires managers to make the exclusion of recurring expense more obvious to investors in order to increase the quality of other exclusions (Kolev, 2008). The assumed consequence of this requirement is that managers would reduce the recurring item exclusions in non-GAAP earnings, resulting in better quality in other exclusions. This should not affect the quality of special items, thereby generally increase the overall quality of non-GAAP earnings number. However, after the release of reg G, there are evidences of managers misusing special items by shifting more recurring items into special items. So instead of adjusting other exclusions, we see more of non-GAAP exclusions in special items (Kolev, 2008). For example, recurring expenses can be assigned as "transitory" special items in their financial statement (McVay 2006). Or they can label them as non-recurring items in press release (Doyle, et al., 2003). Since the classification of expenses in special items are very subjective. For instance, IT expenditures can be allocated as Y2K expenses or expenses of store closures can be classified as restructuring cost. This, naturally, results in

a decrease in quality of special items in its predictive value of firm future performance. It is, however, difficult to say whether this trend was triggered by the regulation intervention on non-GAAP disclosures and managers have found a new methods to opportunistically manipulate the financial results; or it was just a natural response to current economic situations of the firms and market.

2.4. Non-GAAP financial measures and earnings quality

2.4.1. Conceptual framework for earnings quality

Managers often claims that non-GAAP financial measures are more informative, persistent and are a better tool set for predicting future performance. In other words, non-GAAP financial metrics have better earnings quality than standardized GAAP financial results.

In accounting literature, there are various ways of defining and measuring earnings quality of reported income, we use in this thesis the concept and measurement methodology defined in Dechow's article (2010). In the article, proxies for earning quality are organized into three categories: Properties of earnings, Investor responsiveness to earnings and External indicators of earning misstatements (Dechow, 2010). In the scope of this thesis, we focus mostly on two proxies (Properties of earnings and Investor responsiveness) to discuss the quality of non-GAAP earnings quality due to lack of availability of information on external indicators of earning misstatement.

Properties of earnings

Properties of earnings refers to five earnings characteristics: Earnings persistence, Abnormal accruals and modeling the accrual process, Earnings smoothness, Asymmetric timeliness and timely loss recognition, and Target beating.

Earning persistence

The more persistent a company's earnings are, the higher quality of their earnings number. Firms with more persistent earnings have more persistent cashflow, thereby making it better input for discounted cash flow- based valuation. However, the persistency can be originated from both the firm's fundamental performance and the accounting methods in practice. In the other words, even if a company's earnings are very persistent, it is difficult

to tell whether the firms' fundamental performance is really persistent or there might be earning management involved.

Magnitude of accruals

Extreme accruals are considered low quality because they can be interpreted as less persistence in earnings flow. However, this proxy has the similar disadvantage to earnings persistence since the fundamental performance and measurement methods are entangled. It is difficult to distinguish whether the company's poor performance or the accounting method is responsible for the extreme accruals.

Smoothness

Smoothness of earnings are calculated as ratio of earnings and cash flow. The lower the ratio is, the more smoothly earnings move into firm relatively to cash flows. Earnings smoothing is a common accounting practice which helps to bring persistence and informativeness to earnings numbers. Again, the smoothness of earnings can come from company's earnings flow, reporting method or managers' active involvement in earnings manipulation.

Benchmarking/ Target beating

Unusual twists in earnings distribution indicates possible earnings manipulation. Unusual twists can be sudden positive earnings increases, changes in forecast error, beat and meat the target after accounting adjustments, etc. This proxy is easy to measure but it is difficult to tell whether earnings twists are caused by chance, or managers' earnings management behaviors.

Residuals from accrual models

The main goal of these models is to find correlation between accruals and management discretion or estimation errors. Unlikely the other proxies, these accrual models can isolate the drive behind extreme accruals, separating errors caused by accounting method and management manipulation behaviors. It is assumed that the more residuals from accrual models, the lower the quality of earnings is.

Timely loss recognition (TLR)

Timely loss recognition refers to the recognition of losses in earnings in a timely manner. Hence, the higher the TLR is, the higher the earnings quality is. The use of TLR as a proxy for earnings quality can help to distinguish the opportunistic behaviors and the measurement methods.

Investors responsiveness to earnings

The fundamental assumption is that the market is efficient, and investors rationally respond to the information that has value implication. Hence, the higher the correlation with value implies, the better earnings quality is.

2.4.2. Evidence on earnings quality of non-GAAP financial metrics

In the last ten years, the gap between GAAP and non-GAAP financial metrics has increased drastically that raises concerns about the earnings quality of non-GAAP financial metrics. Also, according to Bently et al. (2018), a sudden increase in the number of non-GAAP reports since 2000, right in the beginning of the technology bubble, indicates that there might be earnings management involved. Managers might try to use non-GAAP financial metrics to manipulate earnings to render a better perception of companies' value, especially during crisis period.

Investor responsiveness to earnings: high quality

First of all, one of the common observations is that non-GAAP earnings are often highly correlated to abnormal stock returns. Secondly, the average P/E ratio of companies that publish non-GAAP earnings, is significantly higher than industry's average (Bhattacharya, 2003). This can be interpreted that investors response positively to pro forma figures.

Similar evidences are found from various researches. Although the mean revenue of non-GAAP firms is below the average revenue of companies in the same industry, their stock prices are often higher than market average (Bently et. al (2018), Bhattacharya (2003), and Doyle (2001)). This means that investors perceive non-GAAP earnings to have value

implication and be relevant in equity valuation. Hence in the context of investors' responsiveness, non-GAAP earnings quality is considered quite high. Many studies further explain that non-GAAP earnings are more informative to investors when GAAP earnings are more subjective (Loungee and Marquardt, 2004; Bradshaw and Sloan, 2002). However, the big disadvantage of this proxy is that its difficult to say whether or not investors/analysts are fully able to separate earning management activities versus companies' fundamental operating performance.

Benchmarking/ Target beating: low quality

According to Bhattacharya's report (2003), 80% of non-GAAP reporting companies beat the analysts' forecast. However, while comparing these exact companies' GAAP metrics, only 39% of them beat analysts' forecasts. Also 66% of non-GAAP companies make profit, but only 52% of GAAP companies report a profit. Doyle (2013) findings also state similar phenomena. Firms use non-GAAP earnings that are higher than GAAP earnings are more likely to meet or beat the analysts' forecasts. More specifically, 14% of firms that have positive exclusions beat and met the forecasts (Doyle, 2013

Accruals: No significant different

Non-GAAP companies' accruals do not significantly differ from average accruals of other companies in the same industry (Bhattacharya, 2002)

Earning persistence: higher quality than average

For example, managers acting to ''inform'' will remove income-decreasing transitory items when calculating non-GAAP earnings because excluding the item results in non-GAAP earnings that are more persistent than GAAP earnings. However, managers acting opportunistically will also exclude income-decreasing transitory items when calculating non-GAAP earnings because excluding the item results in non-GAAP earnings that exceed GAAP earnings. It is difficult to disentangle evidences of the information and opportunism hypotheses as both hypotheses predict the same disclosure treatment for income-decreasing transitory items (Curtis, 2014).

Comparability and Consistency: Low quality

We also include the characteristic comparability and consistence in order to have more extensive picture of non-GAAP earnings quality. Since there is no standards and mutual agreements on definition of non-GAAP earnings reports, non-GAAP earnings reports are often not comparable across firms. Furthermore, not only incomparable across firms, types of adjustment vary largely and very challenging to classify non-GAAP adjustments into specific groups. For example, in Bhattacharya's study (2004), after researcher arranges sample of 1989 adjustments into 11 different categories, there are still 13% of the adjustments classified as others which do not belong to any specific categories. Since the exclusions deem to be non-transitory or nonrecurring, companies are less likely to make identical adjustments for two or more consecutive years. Only 10% of companies made similar adjustment with the same definitions in their non-GAAP report in two consecutive years and 68% used totally different definition and made different adjustments every time (Bhattacharya, 2004). Companies are not consistent in publishing non-GAAP financial metrics every year that makes non-GAAP earnings quality very low in term of consistency. As the non-GAAP financial metrics are influent, the time series comparison becomes less accurate and relevant.

Other observations on earnings quality of non-GAAP financial metrics

Researchers find that companies that publish non-GAAP earnings are more liquid and have more debt than the industry average. Non-GAAP firms are more likely to be less profitable and they have higher Research and Development expenses than the industry average (Bhattacharya, 2004).

Another common statement regarding the earnings quality of non-GAAP metrics is that non-GAAP earning metrics are better predictor of companies' future performance, thereby be more relevant in the context of equity evaluation (Brown and Sivakumar, 2003). On the other hand, Lougee and Marquardt (2002) find no significant difference between non-GAAP and GAAP earnings in term of predictive ability. However, the non-GAAP earnings' predictive ability of future cash flow increases, particularly when the GAAP earnings' predictive ability is low (Lougee and Marquardt, 2002).

2.5. Market responses to non-GAAP earnings disclosures

Despite negative criticisms towards the creditability of non-GAAP metrics, market participants still perceive these metrics as informative and put significantly higher weight on non-GAAP earnings metrics than on GAAP operating earnings (Sloan and Bradshaw, 2002; Bhattacharya et al, 2007).

On the contrary, some researchers find no difference in market participants' reaction to non-GAAP earnings metrics or GAAP earnings metrics (Johnson and Schwartz, 2001; Lougee and Marquardt, 2002). On the other hand, Doyle (2003) suggests that market does respond to non-GAAP earnings metrics. They are, however, "fooled by firms' use of pro forma earnings (Doyle, 2003). Doyle went further and explained that although market participants do discount earnings surprises by 10% to 14% when the exclusions are associated with non-GAAP increasing profit; they are not fully able to understand and estimate the predictive power of the excluded items (Gu and Chen, 2003; Goyle 2013). There are clearly contradicting evidences on the capability of investors of properly discount non-GAAP earnings numbers. For instance, Bhattacharya (2003) finds evidence that analysts express skepticism when non-GAAP exclusions transform a loss into a profit, but they do not necessarily discount the non-GAAP exclusions in their valuation models. Similarly, non-GAAP exclusions that help companies to meet or beat the analysts' forecasts are weighted more lightly in investors' valuation (Bhattacharya, 2003). This suggests that market participants including investors and analysts partially perceive opportunistic behaviors but do not fully comprehend the complexity of non-GAAP exclusions.

Furthermore, less sophisticated market participants are more likely to be misled by non-GAAP earnings metrics (Frederickson 2004; Bhattacharya et al., 2007; and Doyle, 2013). In his research, Frederickson (2004) finds that MBA students (as representatives of less sophisticated investors) place 12% higher in stock valuation when they are exposed to income- increasing non-GAAP earnings numbers. Similarly, non-GAAP earnings metrics seem not affect experienced analysts' judgment on stock valuation and they are also inclined to postpone their buy-sell decisions longer than less sophisticated investors after earning announcements. Frederickson (2004) explains further that since analysts use complicated valuation models to evaluate equity value, it helps to reduce bias and

misjudgment concerning non-GAAP earnings. Meanwhile, other less sophisticated investors have no access to such complex models and technology. Their evaluations are more dependent on feelings, simple and intuitive valuation models where non-GAAP earnings have much bigger impact on the valuation.

Other way to examine market response to non-GAAP earnings is market premium that investors give to non-GAAP reporting companies. Johnson and Schwartz (2003) compare firms that disclose pro forma earnings to firms that do not and find that the former trade at higher multiples. However, they conclude that the market premium for pro forma disclosers is not due to these firms disclosing pro forma earnings, but rather due to underlying firm characteristics that are fundamentally different from firms that do not disclose pro forma earnings.

2.6. Criticism on non-GAAP earnings metrics

There seems to be two opposite viewpoints on the creditability and informativeness of non-GAAP earnings metrics. On one side, managers claim that non-GAAP metrics are more informative because by removing non-recurring and non-cash charges, non-GAAP earnings metrics reflect more accurately companies' core business (Weil, 2001; and Bray, 2001). There are various intensives for opportunistic behaviors of managers but on the other hands, managers do have insiders' information on companies' performance and financial health (Barnea, Ronen and Sadan (1975); Healy and Wahlen (1999)). Despite of many incentives for opportunistic behaviors, the most prevalent motivation for non-GAAP reporting is to better inform market participants of companies' performance (Curtis, 2014) According to Bhattacharya et al. (2003) non-GAAP earnings numbers are "more permanent measure of firm profitability than GAAP operating earnings". Brown and Sivakumar (2003) suggest that I/B/E/S EPS numbers are cleaner and have better quality than EPS before extraordinary item from Compustat, thereby have better informative and predictive property. Also, many analysts consider pro forma earnings as a more representative measurement of "core earnings" than GAAP earnings (Bhattacharya et al., 2003). One of the common explanations for the existence of non-GAAP earnings metrics is that firms simply respond to the increasing market demand for accurate information on company core performance. Market participants are free to decide whether to take these

measures into their consideration (Alpert, 2001 and Weil, 2001). Similarly, SEC chairman Harvey Pitt (2001) state that the popularity of non-GAAP earnings metrics is just evidence of lack and inaccuracy of financial information and of limitations of general accounting standards like GAAP. Hence, non-GAAP report is a complementary financial set that overcome the limitations of GAAP reporting system. Analysts themselves also claim that they are competent and capable of judging the credibility and reliability of these non-GAAP earning numbers. For example, when non-GAAP earnings numbers report a profit or beat the analysts' forecasts while the corresponding GAAP earnings numbers don't, investors and analysts are inclined to be more skeptical and more careful on weighting these non-GAAP numbers in their valuation (Bhattacharya et al., 2003). All in all, clear enthusiasm towards non-GAAP financial reporting is more commonly found among companies' managers, investors, and analysts.

On the other hand, scholars and market regulators seem to have a more critical view on "pro-forma" earnings and urge for stricter regulations on non-GAAP earnings disclosures to protect market participants. A large portion of literature provide evidence on the misleading attribute of non-GAAP earnings metrics and firm managers' opportunistic behaviors. Critics claim that non-GAAP metrics are misleading, ad-hoc and not comparable across firms or time span (Weil, 2001; Derby, 2001; Grant and Parker, 2001). Bradshaw and Sloan (2002) claim in their study that managers have tendency to highlight non-GAAP earnings in their earnings announcement without properly comparing them with corresponding GAAP earnings metrics or stating explanations for certain exclusions. This can be interpreted as managers' effort to purposefully frame investors' perception of companies' fundamental performance. Managers also make different exclusions each time in order to reduce the comparability of earning figures (Grant and Parker, 2001). Most of the adjustments made are either to exclude expense or to include transitory gains, which both helps to increase profit and to meet the earnings forecasts (Curtis, 2014). These characteristics of exclusions highly indicate opportunistic behaviors of managers. Many investors and regulators directly criticized non-GAAP earnings metrics as "dangerously flawed" (Byrnes and Derhovanesian, 2002). According to the U.S Treasury (2002), although earnings numbers produced according to GAAP might me inefficient and sometimes fail to reflect fully the companies' operation, usage of non-GAAP earnings metrics does not add more values but rather create distorted perception of earnings. Furthermore, using of non-GAAP earnings will deteriorate the ability of regulators to

enforce GAAP standards (Bhattacharya, 2007). In short, non-GAAP earnings reporting encounters extreme critics that it is not only irrelevant but totally flawed and should be ignored. They do not possess any value-added characteristics in the context of equity valuation.

There have been plenty of concrete examples where managers manipulated non-GAAP earnings metrics to create a more favorable picture of firm performance. In 2001, JDS Uniphase, a manufacturer of optical products, highlighted its $67 million profit (on non-GAAP basis) while purposefully hiding its GAAP earnings of $50.6 billion loss and details on reconciliation of adjustment made in its earnings announcement (Dow Jones 2001). Similarly, in 1999, Trump hotel & casino resort Inc. included a special gain and excluded a special loss in its non-GAAP earnings without disclosing details on the adjustments (SEC, 2002). Moreover, in opposition to analysts' claims, Doyle (2003) argued that investors and analysts pay too much attention to non-GAAP earning metrics and less sophisticated investors and analysts fail not only to see through managers opportunistic behaviors but also to understand the effect and implication of non-GAAP exclusions on predictability of firm future performance. Market regulator, Securities and Exchange commission (SEC), had expressed concerns on non-GAAP earnings metrics and many times issued warnings to firms that opportunistically use non-GAAP disclosures. For examples, in 2001, SEC issued: "We believe it is appropriate to caution public companies on their use of pro forma financial information and to alert investors to potential dangers of such financial numbers" (SEC, 2001). And Lynn Turner, former chief accountant of SEC publicly criticized pro forma earning metrics as "everything but bad stuff" (Dow Jones, 2001).

Regulation G

As non-GAAP earnings disclosures grasped more negative attention from regulators, SEC decided to intervene. In December 2001, SEC officially issued a cautionary warning on the non-GAAP earnings disclosures alleging that despite adding incremental value to GAAP earnings information, pro forma earnings metrics are incomplete and can be ad hoc and misleading. In addition, a new disclosure regulation, regulation G, was officially issued on 28 March 2003.

The reg G requires that:

> *(a) disclose the most directly comparable GAAP earnings number,*
>
> *(b) disclose the reconciliation of the non-GAAP numbers to the GAAP numbers*
>
> *(c) furnish within 5 days, a form 8-K containing an explanation of why management believes the non-GAAP number is useful for investors.*
>
> (Source: Heflin, 2008)

Companies that publish non-GAAP financial metrics are required to identify the "most directly comparable" GAAP measures. Furthermore, companies must provide a reconciliation of the gap between non-GAAP and GAAP numbers and justifications for the exclusions made. These requirements are assumed to enhance the transparency in communication between companies' managers and market participants. Additionally, companies are prohibited to exclude non-recurring and non-transitory expenses in non-GAAP earnings reports if these items are reported in the previous two years and are likely to appear within two years (Regulation S-K/ Item 10 and Regulation S-B/ Item 10). Also, non-GAAP earnings metrics are not allowed to be published on companies' normal financial reports that are prepared according to standard GAAP or in financial notes (SEC, 2002). Companies are also required submit a Form 8_K filling to SEC and are encouraged to disclose additional information on non-GAAP earnings that managers think that would be beneficial, relevant and informative for users of non-GAAP earnings report (SEC, 2002)

After the warning in 2001 and regulation 2003, there was a significant decline in non-GAAP financial measure disclosures, particularly in 2003. (Heflin and Hsu, 2005; Black, 2018). The decrease was, however, temporary (Brown, Christensen, Elliott and Mergenthaler, 2008) and the frequency of non-GAAP disclosures rebounded in 2004 and has gradually increase since then (Black, 2018). More specifically, approximately 60% of firms report non-GAAP earnings metrics in 2013 (Bentley, 2018) and 71% in 2014 (Black, 2018). Heflin and Hsu (2005) also found evidence that non-GAAP earnings are less likely to meet or beat analysts' forecasts, suggesting that stricter regulation might have prevented managers from opportunistic behaviors.

In term of market response, after reg G, market participants still react positively to non-GAAP earnings metrics and often market participants perceive non-GAAP adjustments to be transitory (Marques, 2006; Black, 2018). In general, the quality of exclusion after reg G has increased meaning that they are transitory and non-recurring (Kovel, 2008). Also, there was decline in exclusion magnitude immediately after the reg G (Heflin, 2008). Managers are more cautious and less likely to adjust earnings metrics to meet strategic targets (Heflin and Hsu, 2005; Black, 2017). On the other hand, Kovel (2008) finds that an obvious deterioration in quality of special items and other items, suggesting that firms managers adjust to the new rules and are shifting into special items. Doyle's research (2013) support Kovel's findings, stating that after reg G managers opportunistically use other unexpected items and special items to manipulate earnings so that analyst forecasts are met. Particularly, managers are more likely to exclude stock-compensation, interest, and tax to meet strategic targets (Black, 2017). Seemingly, regulation G had had a temporary impact on aggressive non-GAAP reporting. The effect, however, deteriorated and non-GAAP firms continue to find different ways to exclude non-transitory and recurring items (Black, 2017) in order to create favorable picture of firm's performance. As consequence, SEC issued a Compliance and Disclosure interpretation on non-GAAP financial measures in January 2010 to impose a stricter supervision on the non-GAAP disclosures.

Unlike the intense criticism towards non-GAAP earnings report inside the U.S, outside the U.S market, participants are more accepting of non-GAAP earnings metrics. There are not many regulations in term of how, when and what non-GAAP exclusions are reported. For instance, in IFRS companies can directly add non-IFRS financial metrics along with their IFRS reports if companies provide reconciliations and explanations of the exclusions (Young, 2014). Also, non-GAAP earnings reports that are included in unaudited documents are less regulated and companies are not required to including definition, reconciliation, and explanations for non-GAAP adjustments in these reports (Black, 2018)

Additional regulations

As the effect of regulations G on non-GAAP reporting practices deteriorated, the happening the financial crisis (2008) has given more pressure on regulators for more transparent and accurate financial reporting practices and additional regulations, particularly on non-GAAP reporting. In response to the demand of the equity market for better financial reports, SEC used a Compliance and Disclosure Interpretation on

regulations of non-GAAP financial measures in 2010 (Later on updated in 2011). The additional regulations emphasize the content of reg. G but with the requirements for stricter application and scrutiny from SEC's side. In addition, a taskforce was formed in July 2013 to examine and supervise companies' non-GAAP earnings reports (Rapoport, 2013). The team's goal is to ensure the consistency and accuracy of non-GAAP disclosures (Deloitte, 2011). Black's study (2017) attempted to measure the aggressiveness of managers after these new regulations and found that managers' aggressiveness reduced right after the release of both Reg G. and new regulations. The level of aggressiveness, however, always bounced back after a while (Black, 2017)

A call for a more extensive role of auditors

In addition to stricter regulations regarding non-GAAP financial reporting, SEC also called for a more extensive and active role of auditors in supervising and scrutinizing the use of non-GAAP earnings metrics. Traditionally, auditors play a more passive role in non-GAAP reporting (Black, 2018). Often, they routinely follow and examine non-GAAP relating announcements and reports; and formally verify reconciliations but do not actively opine on the information. A more active involvement of auditors, hence, will assumedly help to ensure the quality of non-GAAP earnings metrics.

2.7. Hypothesis development

The reporting of non-GAAP financial numbers has become popular since 1990s. Up till 2003, the reporting of these street numbers has become more aggressive with both higher frequency and larger adjustments. However, noticing the opportunistic behaviors from companies' managers, market regulators intervened by publishing regulation G. Although non-GAAP metrics decreased drastically after Reg G in 2003 (Heflin, 2005 and Black 2018), the impact of reg G seems to be temporary. The frequency of non-GAAP reporting bounced back since 2004 (Black, 2018 and Bentley, 2018). Not only the frequency, but also the magnitude of exclusions has also been inflated since 1990s. There are two main reasons why managers publish non-GAAP numbers, whether to improve performance perception (Opportunistic behavior) or to better communicate with investors about core performance (Helfin, 2008). However, through out literature about GAAP and non-GAAP

financial metrics, the non-GAAP metrics are almost always higher than GAAP metrics that seems to indicate managers' opportunistic behaviors of misleading the market participants. Therefore, our first null hypothesis is as follow:

H1: The frequency of non-GAAP financial metrics reporting as well as the magnitude of exclusion increased largely in period of 2003 to 2016.

The second hypothesis is about the driving factors of differences (exclusions) between GAAP and non-GAAP metrics. As there is no mutual definitions of non-GAAP adjustments and methods, types of adjustment in non-GAAP reporting varies largely across sections. It is reported that managers tend to exclude non-cash and non-recurring items to arrive to non-GAAP numbers. Especially, items such as stock-based compensation, goodwill, write-down, merge and acquisition cost and research and development expenditures are the most common adjustments in non-GAAP reporting (Sloan and Bradshaw, 2001). Kovel (2008) reported that the quality of adjustment has increased, and managers are more cautious in adjusting financial numbers (Heflin and Hsu, 2995). Contrarily, the use of special items, particularly stock-compensation, interest and tax become more popular in non-GAAP adjustment (Doyle, 2013; Kovel, 2008; Black, 2017). Hence, the effect of Reg G after 2003 has deteriorated and companies simply find new method to adjust their earnings.

Marques (2006) and Entwistle et al. (2006) find declines in the frequency of non-GAAP earnings disclosures and in exclusion magnitudes, but an increase in special-item exclusions.

H2: Special items are the main drivers of the gap between GAAP and non-GAAP metrics.

3. Research design

3.1. Research design

3.1.1. Sample selection

Often I/B/E/S earnings per share is used as a proxy for managers' non-GAAP due to the lack of an extensive sample of direct managers' earnings metrics. I/B/E/S metrics, or in the other words, analysts' non-GAAP metrics agree largely to manager's non-GAAP metrics and often are informative in many contexts. However, as discussed in literature review, usage of I/B/E/S as proxy for manager's pro forma metrics can be misleading and biased. Bently et al. (2018) explains that using I/B/E/S as proxy for manager's non-GAAP will understate managers' aggressiveness in non-GAAP reporting. Therefore, in order to examine the development of managers' non-GAAP earnings metrics in term of frequency and magnitude, we will use the data set from Bently et al.'s study (2018).

The data set is the first publicly available and the most extensive data set of managers' non-GAAP earning. Bently et al. (2018) programmatically searched and extracted managers' non-GAAP *Earning Per Share* (EPS) from quarterly earnings announcements in SEC 8-K filings. The data set consists of 115,370 observations from 2003 to 2012. We use earning per share metric (EPS) to present companies' earnings performance. EPS is calculated as a company's net profit divided by the number of common outstanding shares. EPS is an indicator of company's performance as it indicates investors' perception of company's fundamental performance (Wikipedia).

In order to calculate non-GAAP adjustments between managers' non-GAAP financial metrics and GAAP financial metrics, we collect GAAP EPS data from. We begin with all consolidated companies with quarterly EPS report with fiscal year ending from 2003 till 2016. The time period is decided largely by the availability of non- GAAP EPS data provided in Bently's database. As mentioned in Bently's study the key reason for the time period is that, it became mandatory for firms to publish the filing of 8-Ks for earnings with the implementation of Regulation G in 2003 (Bently et al., 2018).

While combining non-GAAP EPS and GAAP EPS, we eliminate all the companies that do not publish a non-GAAP_EPS metrics to make it comparable. Also, we also exclude all real estate investment funds because these companies are required to report industry-

specific and standard earning announcement (Bently et al., 2018). This process yields in a total of 49918 observations of non-GAAP metrics for period from 2003 to 2016. Out of these 49919 observations, 15 observations do not have GAAP_EPS metrics. Hence, our final sample size for the first hypothesis is 49904 observations that have both GAAP EPS and non_GAAP EPS. The non-GAAP adjustment is calculated as non-GAAP EPS subtracted from GAAP.

For the second hypothesis, in order to identify the key drivers of the exclusions in non-GAAP financial metrics, we identify some income statement items that are likely to correlate to the exclusions as in table 1. As discussed in literature review, managers tend to use transitory and non-recurring expenses. Cost of goods sold item are included because it's often one of the largest expenses in balance sheet. COGS are often recurring, so we do not expect a high correlation with non-GAAP exclusions. Selling and general administration expenses can consist of non-recurring, so there might be a relation with non-GAAP exclusions. As depreciation and amortization expenses is one of the most common types of adjustments in non-GAAP earnings, we also expect a positive correlation between depreciation and amortization line item and exclusions. Since there have been some observations that managers can exclude items like taxes on stock options, deferred compensations, etc. income tax is examined as well. Special items and others consist of common non-GAAP adjustments such as restructuring cost, good will amortization, write-downs, etc. Hence, we expect that special items or others might be the driving force of non-GAAP exclusions. All the variables are deflated by the by the beginning-of-period market value of equity.

Variables	Measurement of the data
EPS_GAAP	Earnings per share, excluding extraordinary items
EPS_non_GAAP	Earnings per share, non-GAAP
Exclusions	(EPS_GAAP) – (EPS_non_GAAP)
COGS	Cost of goods sold / market value of equity
SGA	Selling, general and administrative expenses/ market value of equity
DEP	Depreciation and amortization/ market value of equity
TAX	Income taxes/ market value of equity
SPI	Special items/ market value of equity*
Others	Sales minus income before extraordinary items minus other components (COGS, SGA, DEP, TAX, SPI)

Market value of equity = PRCC_F * CSHO (stock price end of fiscal year * number of shares outstanding)

Table 1: Variables definition and measurement

3.1.2. Model

In order the test whether the exclusions in non_GAAP metrics are associated with income statement components (H2), we use the following logistic regression model:

$$Exclusions = \alpha_0 + \alpha_1 COGS + \alpha_2 SGA + \alpha_3 DP + \alpha_4 TAX + \alpha_5 SPI + \alpha_6 Others + \varepsilon$$

This model is based Denelson et al.'s decomposition framework (Denelson et al. 2001 and Jarva et al., 2019). As discussed in literature review, managers tend to make more

adjustments to non-cash and non-recurring items in their pro forma reporting, we divide income state items into six components which are more likely to have different level of influence on exclusions. Hence, the independent variables consist of COGS (cost of goods sold), SGA (Selling, general administrative expense), DEP (depreciation and amortization), TAX (income taxes), SPI (special items) and Others (Other components in income statement calculated all together). All independent variables are scaled by market value of equity to guarantee comparability. The dependent variable is exclusion which is calculated by subtracting non_GAAP_EPS from GAAP_EPS.

The independent variables are likely to associate with exclusions when they have a positive coefficient across the data set. Before Reg G, items such as stock-based compensation, good will, write-down, merger and acquisition and R&D expenditures are popular. After Reg G (2003), managers have adjusted the method of producing non-GAAP metrics numbers. They are more likely to use special items, interest, and tax (Doyle, 2013; Kovel, 2008; Black, 2017). Therefore, we expect a positive coefficient particularly in tax, depreciation and amortization component, special items, and others.

4. Empirical result

4.1. Descriptive statistics

Year	GAAP_EPS mean	GAAP_EPS std.	non_GAAP_EPS mean	non_GAAP_EPS std.	Exclusions mean	Exclusions std.
2003	0.149	0.802	0.247	0.527	-0.098	0.558
2004	0.189	0.902	0.287	0.550	-0.098	0.660
2005	0.205	0.984	0.301	0.619	-0.100	0.704
2006	0.237	0.942	0.330	0.619	-0.094	0.674
2007	0.241	1.027	0.349	0.629	-0.109	0.770
2008	0.138	1.440	0.340	0.733	-0.203	1.220
2009	0.125	1.424	0.336	0.714	-0.211	1.212
2010	0.151	1.360	0.347	0.693	-0.196	1.151
2011	0.172	1.318	0.359	0.695	-0.187	1.106
2012	0.190	1.287	0.374	0.692	-0.184	1.071
2013	0.211	1.258	0.389	0.696	-0.179	1.033
2014	0.228	1.241	0.406	0.712	-0.178	1.006
2015	0.222	1.342	0.419	0.732	-0.197	1.112
2016	0.221	1.347	0.421	0.739	-0.199	1.110

Table 2: Descriptive statistics

Table 2 shows the mean and standard deviation of GAAP_EPS, non_GAAP_EPS and exclusions for the period from 2003 to 2016.

4.1.1. Frequency of non-GAAP reporting

Frequency of non_GAAP reports from 2003-2015

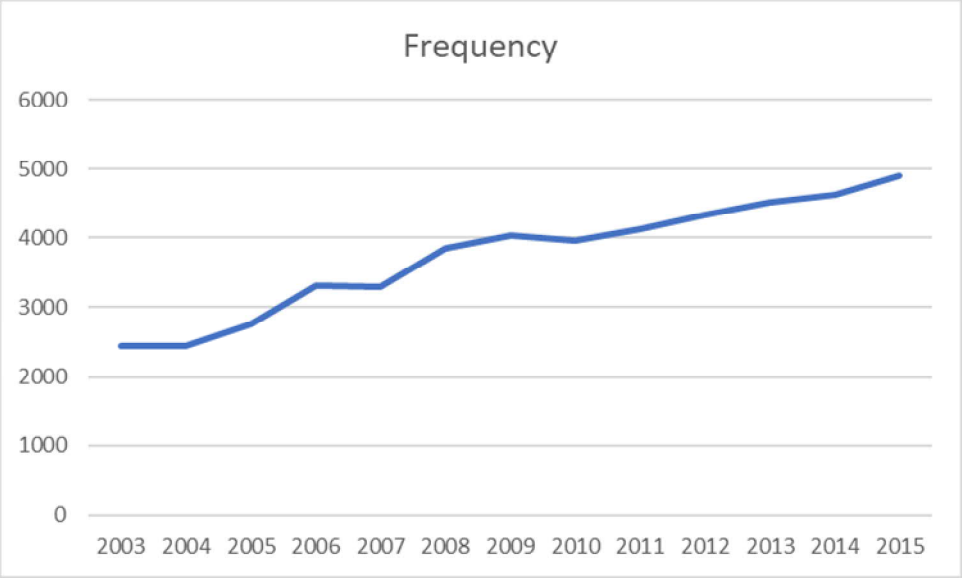

Chart 1: Frequency of non-GAAP reporting (2003-2016)

As the time of gathering data, the fiscal year of 2016 was not closed yet, so we excluded the data for 2016. Chart 1 shows the development of non-GAAP reporting in term of quantity from 2003 until 2015. According to previous literature, there was a drop in the amount of non_GAAP reports immediately after reg G. However, there has been a clear surge in the amount of non-GAAP report since 2004 onwards, one year after the regulation G was issued. Especially during the period of 2003-2004, after the reg G came into effect, we can see a halt in non-GAAP reporting. However, after 2004, the amount of non-GAAP reports has gradually grown showing that the effect of reg G has deteriorated soon after it was released. This proves that the effect of regulation G was temporary. Similarly, the additional regulations imposed by SEC in 2009-2010 also caused a subtle drop on the amount of non-GAAP reports before it recovered and gradually increased again.

On the period from 2004 until 2015 the amount of non-GAAP reports has doubled. This growth in non-GAAP reporting can be seen as the response for the increasing demand for more information in the market. As managers have better insights of their companies,

providing non_GAAP metrics can be seen as managers' effort to provide more accurate picture of their company performance. On the other hand, it has been challenging to prove whether managers publish their non-GAAP measures for opportunistic reasons or not, and the purpose of reg G is to prevent such behaviors. The sudden drop in the amount of non_GAAP reports can be interpreted as that the publishing of non-GAAP metrics is partly driven by managers' opportunistic behaviors. After the reg G managers have adjusted their methods in non_GAAP reporting so that they can still manipulate earning numbers and provide a more favorable picture.

In short, after reg G the amount of non-GAAP reports have increased gradually and, hence has the tendency to increase in the future if there is no further intervention from market regulators. As market are in need for more information, companies naturally want to publish their non-GAAP metrics to provide the market participants with more accurate information. However, since there is not much regulation on non-GAAP numbers, market participants should be aware that managers can use non-GAAP numbers to create a more favorable picture about companies' performances.

4.1.2. Magnitude of non-GAAP exclusions

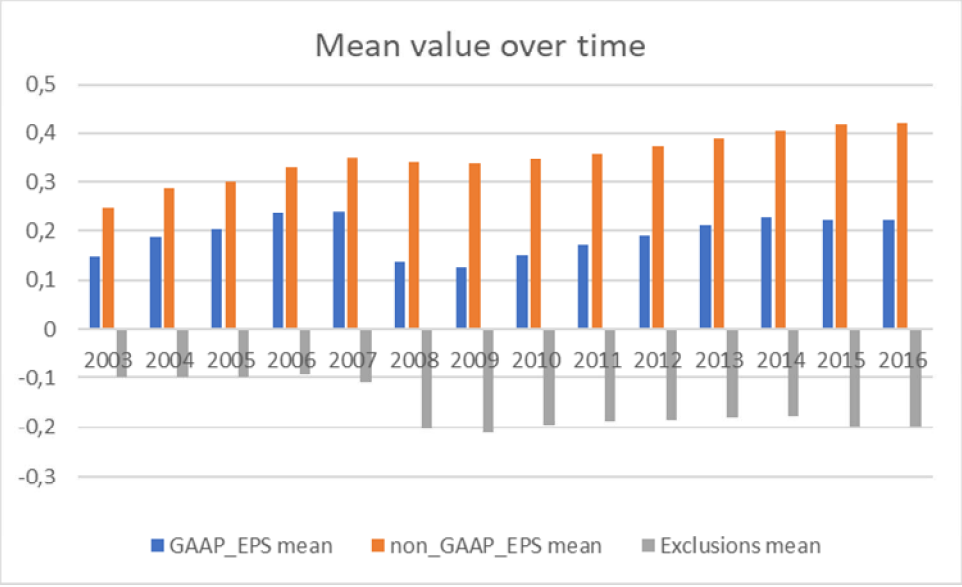

Chart 2: Mean value over time of GAAP_EPS, non_GAAP_EPS and Exclusions (2003-2016)

The first noticable thing from chart 2 is the value of non_GAAP_EPS has been always higher than GAAP_EPS. This agrees largely with observations from previous literature and it also raises the questions about managers' opportunistic behaviors in producing non_GAAP_EPS.

Chart 2 shows that the value of GAAP_EPS have changed over time according to the economic cycle with a sudden drop after the financial crisis in 2008 and its gradual recover afterwards. However, the non_GAAP_EPS data shows a slightly different story. Although the value of non_GAAP_EPS has, to the large extent, followed the development of the GAAP_EPS, the effect of 2008 finanical crisis is rather modest in non_GAAP_EPS value. The mean value of GAAP_EPS dropped 43% meanwhile non_GAAP_EPS shows a modest 2.6% drop in value in the period of 2007-2008. Also, after the drop the value of both GAAP_EPS remains at lower level than before the financial crisis and slightly went up as the economy slowly recover. By 2016 the value of GAAP_EPS was only 0.221 which is only 48% higher than the EPS level of 2013. However, the non_GAAP_EPS level kept growing and peeked at the highest level at 0.421 in 2016, 70% higher than than the level of 2013.

The trend in exclusions naturally follow the same patterns. Before the finanical crisis in 2008, the difference between GAAP_EPS and non_GAAP_EPS had been around 0.1. However, after 2008, the mean value of exclusions surged up to even 100%. It shows that managers got more aggressive in their exclusion in their non-GAAP reporting, especially during crisis period. Also right after the crisis, the exclusion value remained at the high level of about -0.2. There are two possible explainations for this trend. Firstly, after the financial crisis, the finanical performance of companies became and complicated and the standardized GAAP is no longer able to grasp the full picture of companies' performance, leading to a bigger gap between GAAP and non_GAAP performance. Secondly, after the financial crisis, investors are more sceptical and more sensitive to negative financial results, giving incentives to managers to manipulate their companies' finanical performance numbers. Also, since there have been no major interventions from market regulators, managers have adjusted their methods to exclude factors that negativesly affects companies's pictures and become more aggressive in trying to give a favorable picture of their companies' financial performance.

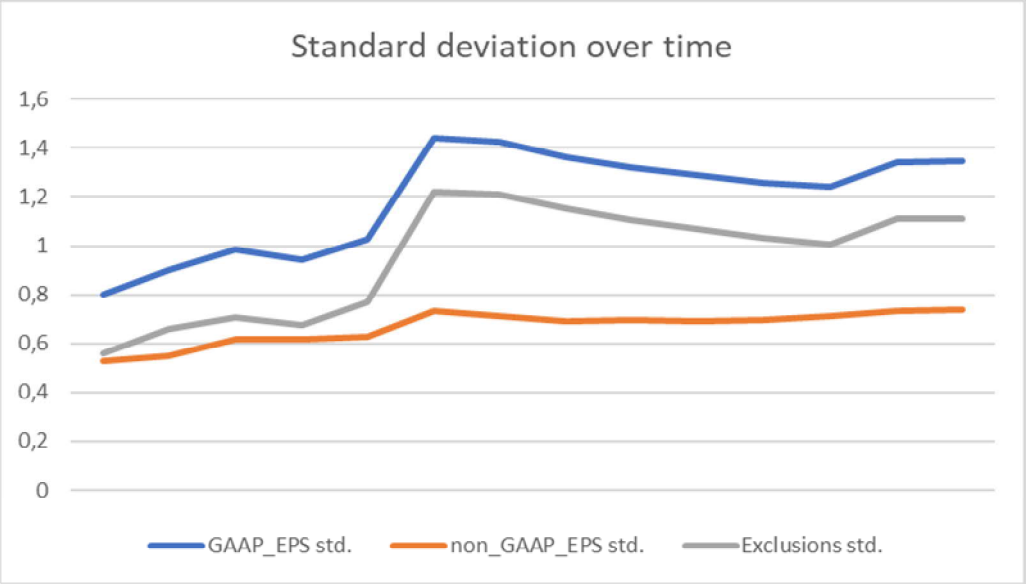

Chart 3: Standard deviation over time of GAAP_EPS, non_GAAP_EPS and exclusions

As the mean value of GAAP_EPS, non_GAAP_EPS and exclusions, their standard deviation values also increase over time, particularly after the 2008 financial crisis. The data spread more widely and seems to have more outliers after 2008.

Also, in order to emperically test the H1, we run a regression for curve fitting in order to see whether the increase in the scope of non-GAAP exclusions are sporatic and random or there is actually a development trend.

$$Exclusions = a0 + a1*t + e$$

with independent variable t representing time series of the development. We assign year 2003 as 0 and year 2016 as 13.

OVERALL FIT	
Multiple R	0.782
R Square	0.612
Adjusted R Square	0.580
Standard Error	0.030
Observations	14

ANOVA

	df	*SS*	*MS*	*F*	*p-value*	*sig*
Regression	1	0.017	0.017	18.96	0,0009	no
Residual	12	0.011	0.000			
Total	13	0.028				

	coeff	*std err*	*t stat*	*p-value*
Intercept	-0.093	0.017	-5.417	0.0002
Year	-0.008	0.002	-4.354	0.0009

Table 3: Summary of liner regression

Table 3 show that variable t has p-value of (0.0009) < (0.05) which is statistically significant. This means that there is an increasing trend in the magnitude of non-GAAP exclusions for the period from 2003 to 2016 that supports H1.

4.2. Analysis of non-GAAP exclusions

Descriptive statistics (N=23075)

	Mean	**Std.**	**Median**
COGS	0.200	0.280	0.100
DP	0.010	0.020	0.010
SGA	0.070	0.070	0.040
TAX	0.010	0.020	0.010
SPI	-0.010	0.050	0.008
Others	0.030	0.110	0.009
Exclusions	0.180	0.440	-0.090
GAAP_EPS	0.270	0.730	0.210
Non_GAAP_EPS	0.450	0.620	0.330

Table 4: Descriptive statistics

Table 3 summarize descriptive statistics of both dependent and independent variables of the regression. Among the independent variables, COGS is the largest expense item with the mean value of 0.2, followed by Selling, general and administrative expenses; and others (Mean values are 0.07 and 0.03, respectively). The smallest expense items are Depreciation, Tax and Special items (Mean values are 0.01, 0.01 and -0,01). Although COGS is the biggest expense in income statement, the cost item is reoccurring one, hence, according to literature, managers are less likely to adjust this line item in their non-GAAP reporting. On the other hand, Depreciation, Tax, special items and other items, despite of their small in scope, are more likely to relate the exclusions in managers' non-GAAP reporting.

Summary statistics of multiple regression

	Coeff	**T-stat**	**P-value**	**Lower**	**Upper**
Intercept	-0.151	-40.761	0.000	-0.158	-0.143
COGS	0.028	2.694	0.007	0.007	0.048
DP	-0.235	-1.789	0.073	-0.493	0.022
SGA	0.404	9.457	0.000	0.320	0.488
TAX	-0.417	-2.591	0.009	-0.733	-0.101
SPI	1.395	6.704	0.000	0.987	1.803
Others	-1.569	-15.551	0.000	-1.766	-1.371

Multiple R	0.513
R Square	0.263
Adjusted R Square	0.263
Standard Error	0.380

Table 5: Summary statistics of multiple regression

Table 5 shows the result of multiple regression. Firstly, the finding indicates that, among the dependent variables, special items are strongly related to non-GAAP exclusions. A coefficient of 1.39 indicates a stronger than normal link between SPI and non-GAAP exclusion. As discussed in literature review, after the regulation G. was issued, managers have excluded non-recurring expenses, especially from special items, worsening the earnings quality of special items. This highly agrees with our hypothesis 2: "*H2: Special items are the main drivers of the gap between GAAP and non-GAAP metrics."*. Secondly,

the Selling, general and administrative expense line time also have strong link to the exclusions, with the coefficient of 0.40. Also, we find an unexpected link between COGS and exclusions with coefficient of 0.02. According Ettredge et al. (2010), misreports in cost of goods sold, and selling, general, and administrative expenses, are highly linked to earning manipulation. As companies ran out of opportunities to make exclusions in normal areas of non-GAAP reporting, they are more likely to commit in earning manipulation by making exclusions in cost of goods sold and selling, general, and administrative expenses. (Rong and How, 2018). The strong link found in COGS and SGA in this study supports this theory largely. Finally, Others, Tax, and Depreciation line items have negative coefficient with exclusions with coefficient values of -1.57, -0.42, and - 0.23. This indicates that managers are moving away from their traditional types of exclusions such as tax item and depreciation and amortization item to new types of exclusions such as special items and other less conventional items like COGS and SGA.

The regression model explains about 26.4% of the variation in non-GAAP exclusion. On one hand, this means mean that line items in income statement do relate to non-GAAP exclusions. On the other hand, this indicates that there are other factors that drives the non-GAAP exclusions.

5. Conclusion

5.1. Research summary

This thesis firstly aims to examine the development of non-GAAP earnings reports for the period from 2003 to 2012 in term of frequency and magnitude. By collecting and analyzing the non-GAAP earnings per share for this period, we find that the number of non-GAAP reports have increased drastically from 2003 until 2012. Although the quantity of non-GAAP earnings metrics reduces slightly after the issuance of Regulation (2003) and additional regulations (2010), the amount of non-GAAP earnings has always bounced back and continuously increased. This phenomenon can be interpreted that the demand for more accurate financial information has gradually increased and the increasing numbers of non-GAAP reports is simply response to this demand. Because managers have better understanding to companies' performance, managers' non-GAAP reports have value implication in equity valuation. On the other hand, the increasing number of non-GAAP reports can be the result of managers' effort to manipulatively influence investors' perception of companies' financial performance.

Secondly, we examined the magnitude and quality of non-GAAP reports by measuring non-GAAP exclusions. Not only non-GAAP exclusions have increase in its scope in the period from 2003 till 2012, but also the gap soared significantly in crisis time. Although GAAP EPS and non-GAAP EPS agree to the large extend, GAAP EPS moved largely according to economic cycle dropping drastically during crisis time while non-GAAP EPS remained high and was less affected by the financial crisis (2008). This indicates that managers become more aggressive in their non-GAAP reporting during crisis time. It is, however, challenging to distinguish manager's intention of providing accurate financial metrics with their opportunistic behaviors.

Lastly, special items are highly correlated to non-GAAP exclusions. Originally, special items are considered high-quality exclusions. However, after the regulation G, managers found new methods to shift recurring items into special items since definition of special items are subjective. As special items have higher power of predictability of company's future performance, removing special items can be misleading and flawed. A strong link between special items and non-GAAP exclusions somewhat suggests possible

opportunistic behaviors of managers. In short, Special items is the key driver behind the difference between GAAP and non-GAAP EPS. Additionally, Selling and general administrative expenses and cost of goods sold are also found positively correlate to non-GAAP exclusions. One of the possible explanations for this finding is that as managers exhaust in the exclusion common in other common areas, managers resort to other exclusions in order to enhance the earnings results. This choice of exclusions strongly indicates possibility of earnings manipulation (Ettredge, 2010). Particularly in selling and general administrative expenses, there are many non-cash and non-recurring expenses can be recorded, making it more likely to be excluded in non-GAAP reporting.

Others item and have negative correlation with non-GAAP exclusions, meaning that managers are not likely to exclude these items in their non-GAAP reporting. Tax and Depreciation item also have negative correlation with non-GAAP exclusions, which do not agree with previous literature. According to previous literature, as depreciation and amortization expenses are often non-cash and non-transitory, there have been various evidence that managers often make exclusion in this line items in their non-GAAP reporting. Exclusions on tax items are less common in non-GAAP reporting, so it explains the negative relation between tax items and exclusions.

5.2. Practical implications

The study shows the increase in popularity of non-GAAP and the increasing level of aggressiveness of managers in their-non-GAAP reporting. Also, the methods of exclusions have evolved largely for the last three decades. Although there have been regulation G. and other additional level, the effect of these regulations deteriorated right after the issuances of these regulation. This, therefore, calls for more extensive regulation enforcements on non-GAAP reporting. And there is a need for a continuous monitoring and supervision so that non-GAAP earnings report serves its purpose of providing complementing information for equity evaluation.

This study also can be used as a warning on quality non-GAAP earnings reports and as an instruction how non-GAAP reports should be utilized. This study also helps market participants to be more aware of the shortfalls of non-GAAP earnings metrics and the

possibility of earnings manipulation in non-GAAP earnings reporting. As the methods and the choices of exclusions have evolved quickly and to a complex level, analysts and investors should not only pay attention to traditional non-recurring exclusions such as other items, compensations, depreciation and amortization, etc. but also to other alternatives like special items, cost of goods sold and selling and general administration expenses.

5.3. Limitations of the study and suggestions for further study

Even though we see exclusions of which income statement items have stronger effects on non-GAAP earnings numbers, we still cannot disentangle the managers' motives of whether to provide more accurate financial numbers or to manipulate the earnings. Hence, further studies on this topic can help to give a clearer picture on how non-GAAP earnings metrics should be used in the context of equity valuation. As the regression model and the choice of independent variables only explain a minor part of the non-GAAP exclusions, this means that there are many other possible factors that explains the development of the non-GAAP exclusions. Hence, further study needs to be done on these topics.

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APPENDIX A

Industry classification of Fama and French (1997)

Aircraft

Agriculture

Automobiles and trucsk

Banking

Alcoholic beverages

Construction materials

Printing and publishing

Shipping containers

Business services

Chemicals

Electronic equipment

Apparel

Construction

Coal

Computers

Pharmaceutical products

Electrical equipment

Petroleum and natural gas

Fabricated products

Trading

Food products

Entertainment

Precious metals

Defense

Healthcare

Consumer goods

Insurance

Measuring and control equip

Machinery

Restaurants, hotel, motel

Medical equipment

Nonmetallic mining

Miscellaneous

Business supplies

Personal services

Real estate

Retail

Rubber and plastic products

Shipbuilding, railroad eq

Tobacco products

Candy and soda

Steel works, Etc.

Telecommunications

Recreational products

Transportations

Textiles

Utilities

Wholesale